

# IMPACT OF GLOBAL FINANCIAL SHOCK TO INTERNATIONAL BANK LENDING IN INDONESIA

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## Abstract

*This study intends to determine whether a shock that occurred in developed countries, the source of funding, was transmitted to Indonesia through international bank lending both directly and indirectly. The methods used estimated the determinants of international bank lending. International bank lending is one form of capital flows that have the potential for rapid reversal and that can lead to a financial crisis as it has in the past. Understanding the determinants of bank lending is important as it can be used to mitigate the impact of a financial crisis in the future. The empirical results showed that international bank lending, either directly or indirectly, contributed to the Indonesian crisis. During the shock, Indonesia saw global banking contract financing. It was also found that credit activities by foreign affiliates in Indonesia saw a contraction in the country of the parent bank during the shock. However, it was found that the bank lending by foreign affiliates, as joint ventures were more stable compared to the branch offices of a foreign bank. In aggregate, international bank lending is affected by push and pull factors such as economic growth (in developed countries and Indonesia), risk factors, and liquidity conditions, both in Indonesia and globally. As for micro-banking models, other than the push and pull factors, the bank balance sheet and other portfolio assets also affected bank lending activities to Indonesia.*

*Keywords: Global Financial Shocks, Foreign Affiliates, International Bank Lending, transmission path, dynamic panel.*

**JEL Classification: C33, E51, G15**

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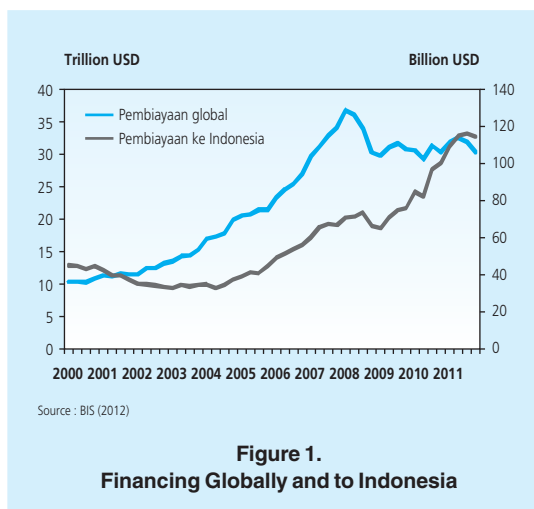
## I. INTRODUCTION

The global financial crisis of 2008 has led researchers to examine the impact on the financial sector. The need for research is increasingly important as globalization in the financial sector has intensified, marked by increasing banking relationships in the world, including the banking sector in developing countries. This led to the financial crisis where there was a high probability of spread from one country to another, especially from developed countries to developing countries (emerging countries).

Related to the impact of the global financial crisis, many studies have been conducted primarily on transmission through the stock market, the foreign exchange market, and the securities market. However, research on the transmission of the global financial crisis through international bank lending is not widely available (Aiyar 2011). From these conditions, it is essential to examine the impact of the global financial crisis through international bank lending in Indonesia.

Global banks provide financing for developing countries through at least two pathways. The first pathway is direct financing or cross-border lending from a central office or from foreign affiliates generally located in developed countries. The second pathway is through the presence of global banks in developing countries either in the form of a branch or a subsidiary that provides loans in developing countries (host country).

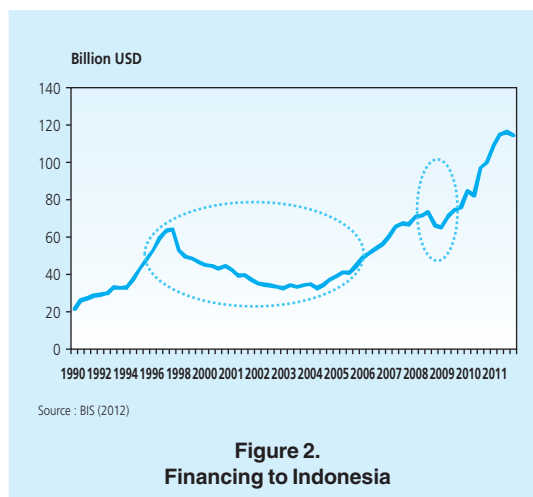
As seen in Figure 1, the international financing activities (international bank lending) rose during the year before experiencing a slowdown in 2008 by the crisis, both globally and in Indonesia as a developing country.



Slowdown in lending activity undertaken by international banking could be viewed from the perspective of global banks' balance sheets. Aiyar 2011 stated that a bank can react to the shock in external liabilities (funding) through one or a combination of the following three ways: 1) the bank may increase its domestic liabilities, i.e. lend more to the resident, 2) banks may reduce assets outside country, reducing loans to non-resident (reduce international lending), 3) the bank may reduce domestic claim, i.e. reduce lending to residents. From this perspective, the conditions related to global finance in 2008 can be seen a second way in which global banking reduces its international lending to the non-resident.

As mentioned by Peria et al (2002), the benefits of the presence of foreign banks in developing countries are the subject of debate. In theory, foreign banks can be a reliable source of funds relative to domestic banks because it is not dependent on local funds that are vulnerable to "go" (flight) and can capture global liquidity sources that are more diversified. The presence of foreign banks in developing countries are also seen as a positive benefit to mitigate the anti-competitive behavior by domestic banks that produce many variations of efficiency with which financial services are provided, low transaction costs, the transfer and the spill-over of knowledge and technical know-how (Pontines and Siregar, 2012). A survey by Goldberg (2009) also showed that the presence of foreign banks in developing countries (host country), is a stabilizing power for the host country because it produces a more efficient allocation. However, the analysis focused on the shock originating in developing countries rather than in developed countries as was the crisis in recent years.

On the other hand, the high banking relationships through international bank lending may be a transmission path for shock that occurs from developed countries to developing countries. Volatility in global bank financing and the high potential risk of sudden sharp reversal accompanies international bank lending. This has the potential to develop into a financial crisis, as happened in the past, e.g. the 1998 crisis. Increased bank lending since the 1990's was



followed by a sharp contraction of credit during the economic crisis in 1998 (Figure 2). The sharp contraction lasted for a long period of time, i.e. up to the year 2004 with a contraction of around 9% per year. Siregar and Choy (2010) stated that the impact of capital flows reversal of the banking sector, in comparison of portfolio equity investment, was considered the main cause of the deepening financial crisis in Asia in the late 1990's.

After recovering from the 1998 crisis, in 2004-2007, the banks increased lending to Indonesia. The importance of international bank lending as a source of financing in Indonesia can be seen from the ratio of the annual GDP for Indonesia where the ratio ranged at 15% (2004-2007). However, the increase was again followed by a decline during the economic crisis of 2008.

Post-crisis bank lending contracted in 2008 to remind policy makers about the role of global banks and international bank lending in transmitting the shock from developed to developing countries. The increasing interlinkage between banks, the volatility risk, the accompanying sudden capital reversal of leading global banks and the role of international bank lending came to the attention of the IMF and the G-20 in its policy reform agenda in 2010 (Pontines and Siregar, 2012).

Several studies have been conducted to examine the behavior of global banks in developing countries. Cetorelli and Goldberg (2009) found that international bank lending from global banks with a high vulnerability to the USD, either directly or indirectly through foreign affiliates, declined during the global crisis. This may imply that international bank lending is a transmission path of shock from developed to developing countries. Pontines and Siregar (2012), using a sample of six developing countries in Asia found similar results. The shock from global banking would reduce bank lending to developing countries (as Indonesia) where exposure (risk) is increasing. Similarly, the behavior of foreign affiliates of global banking (i.e. branches) will reduce lending in the host economy during a crisis, but not so with foreign bank subsidiaries. This condition occurs because foreign banks are locally incorporated subsidiaries in the host country.

As the monetary and banking authority, Bank Indonesia needs to understand the determinants of international bank lending to investigate the impact of capital flows to stabilize the financial sector in Indonesia. This is because exposure to financing from developed countries can be a transmission path of shock during times of financial turmoil in developed countries as a source of financing. Siregar (2012) pointed out the failure to understand the relationship between the bank (global and regional) that pose a risk to the consistency of macroeconomic policy formulation and the ability to anticipate the effects of the financial sector weakness to the country's macroeconomic conditions.

It is important to understand the determining factors of international bank lending to avoid or minimize welfare costs caused by disruption in international bank lending. Generally, determinant factors are analyzed in a framework of push and pull factors as mentioned by

Agenor (1998), Mody, Taylor and Kim (2001) and Ferrucci, Herzberg, Soussa and Taylor (2004). *Push factors* refer to the determinants of global capital flows from the global financial markets, and *pull factors* refer to specific elements in a country that reflect domestic fundamentals and investment opportunities.

Considering the ongoing crisis in Europe and the potential for a prolonged crisis, the study aims to look at the impact of the global crisis on international bank lending in Indonesia, either directly via cross-border lending or indirectly through a representative bank in Indonesia (foreign affiliates). To determine the impact, the study identified the determinants of bank lending to Indonesia, where one of the variables will represent a response to the global banking system during the shock to this country against its lending activities of banks.

This study uses the most recent data that includes individual bank balance sheets aimed to study the behavior of international banks in cross-border lending or via their foreign affiliates. The sample in this study focused on a Foreign Bank Branch Office legal entities established under foreign law and headquartered abroad and a mixed Bank Group (subsidiary) whose shareholders are Foreign Banks and Domestic Banks.

Specifically, the first objective of this paper is to analyze the direct impact of the global shock through the placement of international global bank lending to banks in Indonesia. The second objective is to analyze the indirect impact of the global credit shock through foreign affiliates operating in Indonesia.

The second section of this paper is the literature review. The third section discusses the methodology and the data used; while the fourth section presents the stylized facts and empirical results. Conclusions and policy implications are given in the fifth section and closes the paper.

## II. THEORY

### 2.1. Basic Approach

#### ***Modern Portfolio Theory (MPT)***

*Modern Portfolio Theory (MPT)* is a theory in finance that attempts to maximize portfolio expected return with a certain risk level or a way to minimize the risk to a certain level of expected return done by selecting proportions of various asset choices. MPT is a mathematical formulation of the concept of diversification in investing, where the aim of selecting a collection of investment assets as a whole is lower than the risk of a single asset. This theory was first introduced by Harry Markowitz (1952) which was further developed by James Tobin (1958) by adding an asset that is risk-free to the analysis.

The underlying concept of MPT is that the assets in an investment portfolio should not be selected individually based on their characteristics, but also should consider changes in asset prices relative to prices of other assets in the portfolio. MPT defines risk as the standard deviation

of the return, and models a portfolio as a weighted combination of the assets, so the return of a portfolio is a weighted combination of a return of assets in the portfolio. By combining assets with returns that are not perfectly correlated, MPT seeks to lower the total variance of the portfolio return.

MPT assumes that investors are risk averse, meaning where two portfolios that provide the same expected return, investors will prefer a portfolio with a lower risk. So the investor experiences higher risk if the compensation is greater for an expected return. Also, investors who want a high expected return experience a higher risk.

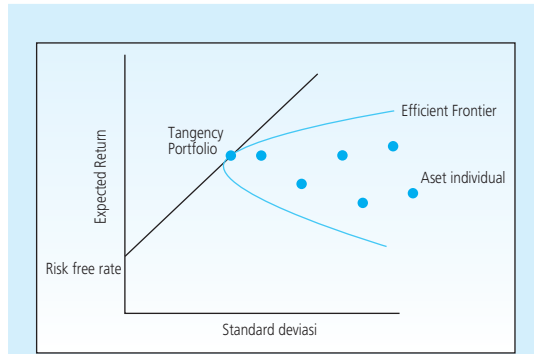
The investor has two choices, such as a risky investment portfolio that has a higher rate of return  $R_A$  and variance  $\sigma_A^2$ , and a lower investment with returns  $R_B$  and risks that are also lower, variance  $\sigma_B^2$ . Investors can invest their funds with the proportion of  $\omega_A$  for asset-A and as big as  $1-\omega_A$  for asset-B, then *expected return portfolio*,  $R_p$  and risk portfolio  $\sigma_p^2$  is:

$$R_p = \omega_A R_A + (1 - \omega_A) R_B \quad (1)$$

$$\sigma_p^2 = E(R_p - E R_p)^2 = \omega_A^2 \sigma_A^2 + 2\omega_A(1 - \omega_A)\rho_{A,B}\sigma_A\sigma_B + (1 - \omega_A)^2 \sigma_B^2 \quad (2)$$

Where  $\sigma_A, \sigma_B$  is the standard deviation  $R_A$  and  $R_B$ , and  $\rho_{A,B}$  is the correlation between  $R_A$  and  $R_B$ .

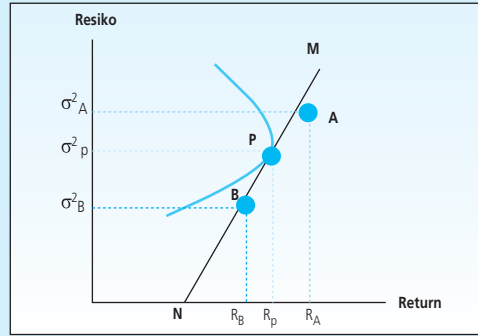
The combination portfolio that considers the relationship of risk (standard deviation) and return is illustrated Figure 3 *Efficient Frontier*.



**Figure 3.**  
**Efficient Frontier**

Without the risk free asset, the red line is called *efficient frontier*. The lines represent the entire portfolio that lies between the global portfolio with minimum variance and that has a maximum return. A portfolio on this line had the lowest risk for a given level of return or the highest rate of return with limited risk.

To find an optimal portfolio allocation (Figure 4) between investment A and B then use capital market line MN which is a combination of return and risk of risky assets and no risk. The slope of this line in equilibrium will touch the *efficient frontier* curve at the point P, which is a combination of a portfolio that has a return  $R_p$  and risk level. If investors want to gain a greater return, then they should add to its investment portfolio a risky asset so that the risks become greater or towards M point. Conversely, investors will earn a smaller return when holding an investment of smaller risk or move toward N.



**Figure 4.**  
**Efficient Portfolio**

The number of optimal investment  $\omega_p^*$  is obtained from the substitution equation (1) and (2) with the slope  $\sigma_p^2(R_p - N)$  and slope  $(\partial \sigma_p^2 / \partial \omega_p) / (\partial R_p / \partial \omega_p)$  as used by Miller (1971), and we obtain:

$$\omega_p^* = \frac{(\sigma_F^2 R + K)}{(L + KR)} = f(R, \sigma_A^2, \sigma_B^2) \quad (3)$$

where

$$R = \frac{(R_A - R_B)}{(R_p - N)} \quad (3a)$$

$$K = \sigma_F^2 - \rho \sigma_A \sigma_B \quad (3b)$$

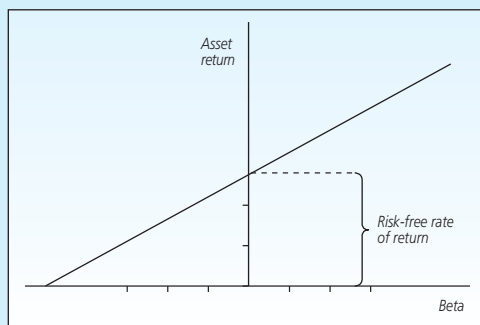
$$L = \sigma_A^2 + \sigma_B^2 - 2\rho \sigma_A \sigma_B \quad (3c)$$

### Arbitrage Pricing Model (APM)

Financial theory was known to be part of scientific study since its introduction Sharpe (1964) in the journal "*Deriving Capital Asset Pricing Model (CAPM)*". The assumptions set out in the CAPM theory is that the investor diversifies their asset portfolio for specific risk to the portfolio. Further development of the theory of Capital Asset Pricing Model (CAPM) by Ross (1976) added macroeconomic risks to the CAPM market risk variables known as the Arbitrage Pricing Model (APT Model) which is shown as follows:

$$E(R_i) = \pi_0 + b_{ij}\pi_i + b_{12}\pi_{12} \quad (4)$$

Explanation of the model in question is the Expected Return of a portfolio of assets that are affected by *Risk Free Asset* factors and the accumulation of all of the risk premiums from unanticipated changes of risk  $b_{ij}$  which is the coefficient of risky assets and other assets.



**Figure 5.**  
**CAPM and APM**

However, criticism of the theory of APM points to items not specified in the model of macroeconomic factors such as interest rates, exchange rate risk, inflation or business cycle fluctuations which become independent variables in determining the expected return of a security. Moreover, empirical evidence shows that the sensitivity of each security to different macroeconomic changes are reflected in the factor loading  $b_{ij}$ .

### Determinant Capital Flows

There is significant literature that attempts to identify the main factors behind the increase in the flow of funds to developing countries since the 1990s. Literature related to the determinants of capital flows to developing countries generally focus on two (2) groups of factors: the *pull* and *push factors* (Agenor, 1998).



*Push factors* are external and related to economic development in developed countries that affect the supply of capital flows to developing countries. Factors often cited as the main push factors are the low interest rates in the United States or a decreased level of international interest rates that occurred in the early 1990s. Another push factor often mentioned is the slowing growth in the United States that encourages capital flows to developing countries.

The *pull factors* are country-specific, internal and related to economic development in the recipient country of capital flows that affects the demand for capital flows. Pull factors are commonly associated with domestic productivity, stabilizing inflation, money supply and structural reforms. As mentioned by Vita and Kyaw (2007), some countries experiencing inflation expectations (associated with stabilization or liberalization policy credibility of financial markets), has led to an increase in domestic money stock due to capital inflow. An example of other factors that shapes and *pulls* capital inflows to developing countries is a positive shock to the productivity that occurs in the tradable sectors. It is seen as a reflection of increased efficiency in the use of domestic capital stock.

### **Bank Balance Sheet Structure**

In general, the structure of banks' balance sheets consist of the components as shown by the following figure:

Table 1. Bank Balance Sheet Structure	
Active	Passive
Excess Reserve	Current Account and Savings
Statutory Minimum	Deposits
Credit	Other funding Sources
Government Bonds	Capital
SBI	
Term Deposit	
PUAB	
Other securities	
Source: Zulverdi et al 2004 (adapted)	

As financial intermediaries, banks raise funds from the public and distribute it back in the form of credit or other forms to those who need funds. Funds collected may come from third-party funds (TPF) and other funding sources (both derived from external borrowing and internal borrowing). The funds are to contain costs (cost of funds), so as to benefit, the banks invest these funds into various forms of assets that contain a certain level of return and risk (the principle of optimizing the allocation of the portfolio).

The forms of assets that may be an option for the bank to get a return are for example, in the form of loans, government securities, money market or monetary instruments such as SBI and term deposit (TD), as well as capital markets, etc. Zulverdi et al (2004) stated that all banks face the problem of short-term liquidity management and are always working to optimize the composition of the portfolio to generate maximum profit level. However, these efforts are limited by the balance sheet constraint, where at any time the total assets must equal liabilities.

## 2.2. Global Crisis Effect on the Financial Markets

Research on the impact of the global shock to the financial sector in Indonesia has been carried out and viewed from different aspects in the financial sector. Research by Kurniati et al. (2008), examined the domestic financial market integration with global financial markets to determine the impact of the global crisis on the domestic financial markets. Aspects observed in the financial market included the market of stocks, bonds and foreign exchange. The study concluded that there is a correlation between the three financial markets in the country. By using the standard deviation method, regression with error correction model approach, it was generally found that the financial market in Indonesia is integrated with the global market, though with different intensities.

The regression model used is as follows:

$$\Delta Ri,t = \alpha_{i,t} + \beta_{i,t} \Delta Rb,t + \epsilon_{i,t} \quad (5)$$

where  $Ri, t$  is the domestic stock price index and  $Rb$  is the benchmark index of global share prices.  $\Delta$  shows the difference of the variables. Regression results above show that the global stock indices DJIA significantly affected the domestic stock price index (JCI). This significant effect indicates that the domestic stock market is integrated with the global stock market. In addition the share price, domestic determinants are estimated with an error correction model with a long-term equation as follows:

$$JCI = f[DJIA, \text{Earning Yield}, \text{Domestik Credit}, \text{Industrial Production}, \text{Capital Flows}] \quad (6)$$

The estimates show that in the long-run, stock prices in Indonesia are affected by global stock prices and the performance of public companies, while the fundamentals do not entirely affect the stock price. The same model was also applied to the bond market and the foreign exchange market.

In general, the stock market showed the highest intensity of integration where global stocks significantly affected the movement of domestic stock. Meanwhile, a lower intensity was found in the bond market due to relatively recent integration of the domestic bond market with the global bond market. For the foreign exchange market, the integration is of a mixed

nature that occurs due to the movement of the dollar in the opposite direction of the global currency. Thus, the effect of the crisis on the global markets most influenced the stock market compared with other financial markets along with higher market integration with the global stock market.

While the research of Dewati et al (2009) saw the changes of risk in financial markets at times of crisis and changes in lending behavior of the banks. The risks studied were on the bond market as represented by the Credit Default Swap (CDS) and the yield on government securities. The OLS method to find the determinants that affect the CDS are estimated by the following equation:

$$CDS = f[D(ICRG), Volatility\_IHSG, D(CADEV), D(IDR)] \quad (7)$$

The study found that the main determinants of CDS were the interest rate and differential rate while the volatility of the stock index and foreign exchange reserves were also determinants albeit with a smaller value. Crisis situations are represented by a rating of a country significantly affected the CDS number. Further study of the determinants of yield gives the following equation:

$$Yield\ SUN = f[M1\_Growth, CDS\ Rate, BI\ Rate, IDR\ Growth, AR(1)] \quad (8)$$

The study found that CDS is a significant factor affecting yield. The higher the tenor of the SUN, then the higher the effect of the CDS, which means there is increasing perceptions of risk for investors.

Furthermore, the study also looked at the effect of a crisis on the banking behavior. Factors specifically observed were risk aversion in banking during the current crisis as represented by variable interactions between monetary policy and the balance of power banking (investment banking in assets other than loans). Under conditions of tight monetary policy during the crisis, bank lending sensitivity increased with the strength of bank balance sheets so that the expected coefficient is positive. Using the panel model of 120 banks, the study found, that in times of crisis, the rate of risk aversion increased and significantly affected lending by domestic banks.

Subsequent research by Kurniati and Jewel (2009) looked at the impact of the crisis to the real sector of Indonesia's GDP and found that a significant external shock was transmitted to the Indonesian economy. Using SVAR, the dependent variable of Indonesia's GDP was estimated in the long-term by the following equation:

$$pdb-ind = \alpha + \beta_1 xqs + \beta_2 R + \beta_3 cflow + \beta_4 vix + \beta_5 gdp\_us + \varepsilon \quad (9)$$

From the estimation, it is known that Indonesia's economic growth is significantly influenced by the value of exports (*xqs*), capital flow (*cflow*), and the global economy that is represented by GDP USA (*gdp\_us*). This means that the decline in global economic growth, represented by the growth of USA significantly effects economic growth in Indonesia.

### 2.3. Internal and External Capital Market Banking and Balance Sheet

When a shock occurs, for example to liquidity sources in banking balance sheet, bank reactions can differ depending on the type of bank, i.e. small independent banks, small banks affiliated with large banks or big banks. Affiliate bank can come from the country and overseas.

Suppose a shock occurs in economic conditions which causes a reduction in deposits due to tighter monetary policy or other systemic conditions in the economy. Reduced funding from the source can be transmitted to the real economy by reducing loans granted by banks due to rising costs faced by the banks to obtain bank funds or the inability to obtain replacement funding.

Bank balance sheet consists of assets on one side and liabilities on the other side. Bank assets consist of current assets and “relative” assets such as substandard loans to customers. Liabilities consist of bank deposits, funds and banking capital.

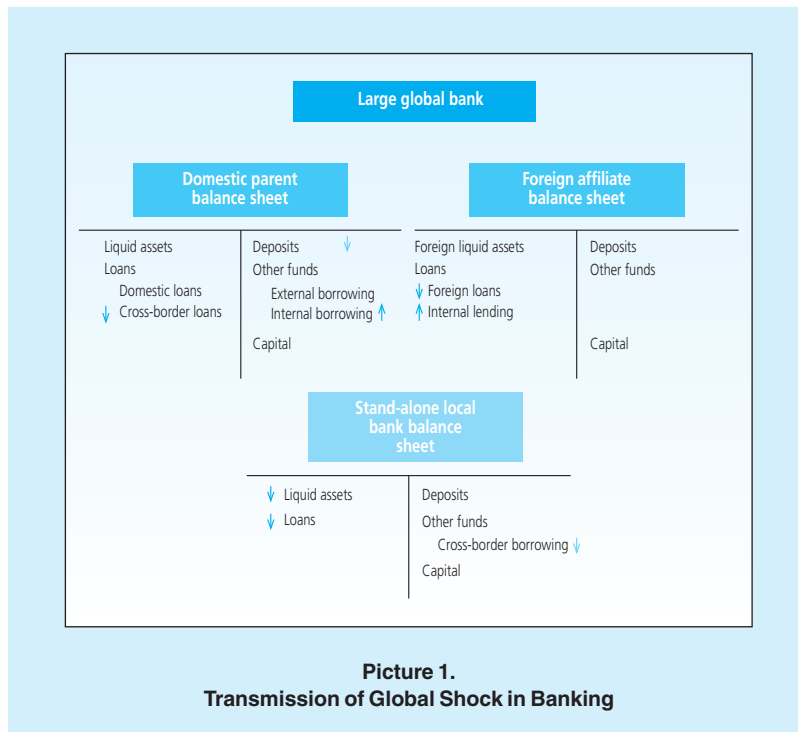
The impact of reduced bank funding can be different for big banks and small banks. Big banks generally have better access to financial resources than small independent banks. Kashyap and Stein (2000) as mentioned in Cetorelli and Goldberg (2009) concluded that the impact of liquidity shock (which is characterized by reduced deposit) are less for big banks compared to smaller banks.

Cetorelli and Goldberg (2008) suggested an additional channel through internal capital markets that distinguishes the behavior of big banks which is related to “globalness” of the bank. Global banks have a network (affiliates) and the additional advantage to replace the lost liquidity. Global banks can cover missing liquidity by borrowing (or reduce lending) to affiliates abroad. Research by Cetorelli and Goldberg (2008) showed that the major banks in America were able to isolate lending channels from monetary policy in the U.S. as a global bank has an overseas network. Foreign affiliates to a certain degree serve as a guarantor of liquidity (liquidity hedges) which could potentially provide global banks greater access to internal capital throughout the banking organization. On the other hand, it also implies that the globalization of banking led to affiliates, can transmit shock through the bank’s internal organization.

In the event of a global shock, the reaction of banking in developing countries can be distinguished by stand-alone domestic banks that are relatively small and foreign banks with foreign affiliates of global banks. The upper panel of Picture 1 below shows the balance of foreign parent banks and their foreign affiliates. Shock liquidity in a foreign parent bank can be compensated by increasing the internal borrowing of their foreign affiliates, or by lowering their cross-border loans so that domestic lending activity remains relatively unchanged / stable. This was confirmed by Correa and Murry (2009) which showed that a contraction channel of cross-border lending was done by banks in the U.S..

In foreign affiliates, the increased internal lending to the parent bank will be compensated by reducing the illiquid assets or lending activity in the host country. Local claims were found to be in significant decline by U.S. banks (Cetorelli and Goldberg, 2009).

On stand-alone domestic banks, the global transmission of shock can occur with reduced cross-border loans from global banks which goes directly to domestic banks. Without access to other finance, loans granted by domestic banks contract with decreasing cross-border funds received.



## 2.4. International Bank Lending Research

Research on the effects of the contraction external financing to bank lending behavior was conducted by Aiyar (2011). From the perspective of bank balance sheets, the banks may react to a shock in the external liabilities in any one or combination of the following three ways:

1. Banks can increase its domestic liabilities, i.e. increase borrowing to residents;
2. Banks may reduce its foreign assets, i.e. reduce lending to non-residents;
3. Banks can reduce domestic claim, i.e. reduce lending to residents.

Aiyar (2011) examined under what conditions banks react to a shock in the external liabilities by using the option (3), so that the financial shock propagation transmits to the real domestic economy.

Cetorelli and Goldberg (2009) conducted a study on the global transmission of a shock to observe international bank lending from 17 countries (source of funding) to 24 developing countries comprising the region of Latin America, Asia and Europe. The study was aimed to determine at the time of the global crisis 2008-2009 if a contraction in cross-border lending from developed to developing countries, for local claims granted to foreign affiliates in the host country and domestic claims given by domestic banks, was due to the shock of cross-border lending. One factor accounted for was the vulnerability of the banking system in developed countries to the global crisis as marked by the banks' balance sheet exposure against the U.S. dollar. The model used is as follows:

$$\Delta L_{ij} = \beta_0 + \beta_1 \cdot \Delta D_i + \eta_j + \varepsilon_{ij} \quad (10)$$

Where  $i$  represents the individual banks' lending sources,  $j$  is the banking borrowing countries,  $\beta_0$  is the constant,  $\Delta D_i$  indicator of the liquidity shock experienced by banks  $i$  and  $\eta_j$  is unobservable factors that explain the shock to the loan demand in the country  $j$ .

Using BIS data, Cetorelli and Goldberg (2009) found that banks from countries that had a higher exposure to USD assets decreased cross-border lending growth in lending to developing countries. The same was found for local claims granted by foreign affiliates in the host country. Local claims in developing countries by foreign affiliate contraction caused a supply shock due to vulnerability of the banking system. Thus, the crisis had been transmitted from developed countries to developing countries through a reduction of cross-border lending and local claims by foreign affiliates.

Furthermore, the study also looked at loans of domestic banks in developing countries with respect to the supply shock arising from the reduction in cross-border loans. The same was found by Cetorelli and Goldberg (2009) where domestic bank loans that were vulnerable to crisis, had a lower vulnerability compared other countries.

It can be concluded that international bank lending has a shock transmission path from developed countries to developing countries characterized by decreased cross-border lending by global banks, declining local claims by foreign affiliates in the host country and a decline in loans granted by domestic banks as a result of a decline in cross-border funding of domestic banks.

Another study on the global impact shock to international bank lending in developing countries was carried out by Pontines and Siregar (2012). This study used a dynamic panel model with a sample of international bank lending in three countries (USA, Japan and the UK) to six developing countries in Asia (Thailand, Singapore, South Korea, Malaysia, the Philippines and Indonesia). The data source used was the data from Bank International Settlements (BIS) taken at an observation period 2000-2010. The study was conducted in aggregate to the international bank lending and micro-lending to foreign banks in the host country. The model for the dependent variable cross-border lending is as follows:

$$\Delta \log \text{claims}_{i,t} = \alpha_0 + \alpha_1 \Delta \log \text{claims}_{i,t-1} + \beta_1 \text{indiff}_{i,t} + \beta_2 \text{VIX}_t + \beta_3 \text{Clender}_{ij,t} + \beta_3 \cdot \text{growthrate}_{j,t} + \beta_4 \cdot \text{growthrate}_{i,t} + \beta_5 \cdot \text{growth}_{i,t} \cdot \text{xexposure}_{ij,t} + v_{ij,t} \quad (11)$$

Where  $i$  and  $j$  represent the partner countries  $i$  and  $j$ ,  $i$  is the source of funding, i.e. U.S., Japan and the UK and  $j$  is the loan recipient countries, i.e. Thailand, Singapura, South Korea, Malaysia, Philipines and Indonesia.  $\Delta \log \text{claims}$  is the difference in the logarithm of international bank lending from banks in the home country to the host country  $j$ ;  $\Delta \log \text{claims}_{i,t}$  is the lag of the dependent variable. Independent variables representing macroeconomic conditions, are represented by the GDP growth in the host country  $j$   $\text{growthrate}_{j,t}$  and  $\text{growthrate}_{i,t}$  home country as well as the interest rate differential between the *home* and *host country*  $\text{indiff}_{i,t}$ . Variable  $\text{Clender}_{i,j,t}$  represents the *common lender effect* where movement of the *international bank lending* from one country can be transmitted to other countries that are also in debt to the same international banks.

In addition to macroeconomic factors, the global financial market is also one of the variables. Variable  $\text{VIX}_t$  (S&P *Volatility Index* from *Chicago Board Options Exchange*) represents the expectations of the global financial market volatility where in the short term there is an expected negative sign for this variable. The higher  $\text{VIX}_t$  the higher the expectations of the global financial market volatility which would lead to reduced bank lending. Furthermore, to examine the impact of the shock in the developed world to bank lending by banks in developed countries, an interaction variable  $\text{growthrate}_{i,t} \cdot \text{xexposure}_{i,j,t}$  is used. This variable is the interaction between the growth in developed countries with banking exposure from developed countries- $i$  to the developing countries- $j$  (where exposure is the ratio between loans from state banks- $i$  to developing countries- $j$ , with total bank loans from country- $i$ ).

Meanwhile, to observe the behavior of foreign affiliates in developing countries, Pontines and Siregar (2012) used micro dynamic models that incorporate individual bank balance sheets as follows:

$$\begin{aligned} \text{loangrowth}_{i,t} = & \alpha_0 + \alpha_1 \cdot \text{loangrowth}_{i,t-1} + \beta_1 \cdot \text{growthhome}_{i,t} + \beta_2 \cdot \text{intratehome}_t \\ & + \beta_3 \cdot \text{growthhost}_{i,t} + \beta_4 \cdot \text{intratehost}_{i,t} + \beta_5 \cdot \text{solvency}_{i,t} + \beta_6 \cdot \text{weakness}_{i,t} \\ & + \beta_7 \cdot \text{intratemargin}_{i,t} + \beta_8 \cdot \text{liquidity}_{i,t} + \beta_9 \cdot \text{profitability}_{i,t} + \beta_{10} \cdot \text{size}_{i,t} \\ & + \beta_{11} \cdot \text{crisisdummy}_{i,t} + v_{ij,t} \end{aligned} \quad (12)$$

Where  $i$  represents individual foreign banks operating in six developing countries in Asia. The dependent variable  $\text{loangrowth}_{i,t}$  is the growth of the bank lending affiliates either branch or subsidiary in the host country. In addition to macroeconomic factors such as in the above equation, the model also includes the micro level variables such as the asset size of the bank balance sheet  $\text{size}_{i,t}$ , return on assets (ROA)  $\text{profitability}_{i,t}$ , ratio of capital to total assets  $\text{solvency}_{i,t}$ , the ratio of liquid assets to total assets  $\text{liquidity}_{i,t}$ , the ratio of loan loss provision to net interest

revenue and net interest margins weakness *intratemargin*. The variable *crisisdummy<sub>it</sub>* is the value 1 for the year 2008 -2009 to capture the global crisis period.

The results found that the cross-border lending has a shock transmission path from developed to developing countries characterized by a positive and significant coefficient on the variable *growth<sub>it</sub>. xexposure<sub>ij,t</sub>*. This indicates that in the event of a shock in advanced economies, banks in developed countries reacted by lowering bank lending to developing countries despite increased exposure to countries like Indonesia. The same was found for the foreign affiliates of global banks in Indonesia. In times of crisis, foreign affiliates also reduced credit activity in Indonesia, especially if the bank was a branch.

Research was conducted using a special sample in Indonesian by Abdullah (2010). This study looked at the role of global banks as a channel for shock transmission to the home country Indonesia (host country). Using panel data models and BIS bank data in Indonesia, the study distinguished the effect of cross-border lending and local claims in the country conducted by a branch or subsidiary of a global bank in Indonesia. The model used is as follows:

$$\begin{aligned} \text{foreignclaims\_growth}_{j,t} &= \beta_0 + \beta_1. \text{Homefactors}_{j,t} + \beta_2. \text{Hostfactors}_j + \beta_3. \text{AFCDummy}_t \\ &+ \beta_4. \text{GFCDummy}_t + \beta_5. \text{AFCDummy}_t \text{xexposure}_t \\ &+ \beta_5. \text{GFCDummy}_t \text{xexposure}_t \end{aligned} \quad (13)$$

Where  $j=1$  to 4 is a developed country that has a high banking relationship with Indonesia such as Japan, U.S., Germany and UK,  $t$  represents the time of the year 1994-2009, *foreignclaims\_growth* is a semi-annual changes in *foreign claims* from the bank in *home country j* to Indonesia, *Homefactors* are variables that describe macroeconomic conditions in developed countries such as interest rates and GDP growth. *Homefactors* are variables that describe the macro-economic conditions in Indonesia, such as interest rates, GDP growth and the exchange rate. *AFCDummy* is the Asian crisis dummy variable with a value 1 for the period 1997 - 1999, *GFCDummy* is a dummy variable for the global crisis which is set at 1 for the period 2007-2009 *exposure* while is the ratio of bank loans from country  $j$  to Indonesia of the total foreign claims to banks provided by the developed countries.

To observe the growth of *local claims* by foreign affiliates, it is done by replacing the dependent variable in the equation to become local claims while other variables remain the same as the previous equation - the growth of local claims is expressed as follows:

$$\begin{aligned} \text{localclaim\_growth}_{j,t} &= \beta_0 + \beta_1. \text{Homefactors}_{j,t} + \beta_2. \text{Hostfactors}_j + \beta_3. \text{AFCDummy}_t + \\ &\beta_4. \text{GFCDummy}_t + \beta_5. \text{AFCDummy}_t \text{xexposure}_t + \\ &\beta_5. \text{GFCDummy}_t \text{xexposure}_t \end{aligned} \quad (14)$$



The study concluded that international bank lending in the form of cross-border lending is a crisis transmission path as represented by the significant and negative crisis dummy variable in the foreign claims Equation to Indonesia (Equation 13). Meanwhile, the increased exposure of global banks to Indonesia indicates more stable financing in Indonesia where the interaction between the crisis dummy variable and exposure is positive and significant. For local claims that were given to foreign local banks branches in Indonesia, the variable that significantly affected the macroeconomic conditions in Indonesia, were the growth of GDP and the exchange rate, while the crisis factor did not affect lending significantly. This means that there are differences between the characteristics of direct financing (i.e. cross-border lending/ direct financing) which is more volatile than the local lending (by foreign affiliates). This confirms the role of the global banks that direct cross-border lending is a transmission path for shock.

The main contribution of this study is to provide empirical results on the effect of international bank lending, either directly, namely cross-border lending from foreign banks or indirectly through foreign affiliates operating in Indonesia using a dynamic panel approach. Micro data to model foreign affiliates operating in Indonesia comes from BI, while the data for the cross-border model or foreign claims to Indonesia comes from BIS.

### **III. METHODOLOGY**

#### **3.1. Data**

The data used comes from the Bank of International Settlements (BIS), Indonesian bank lending data from the Department of International (DIInt) and bank balance sheets from the Department of Licensing and Banking Information (DPIP).

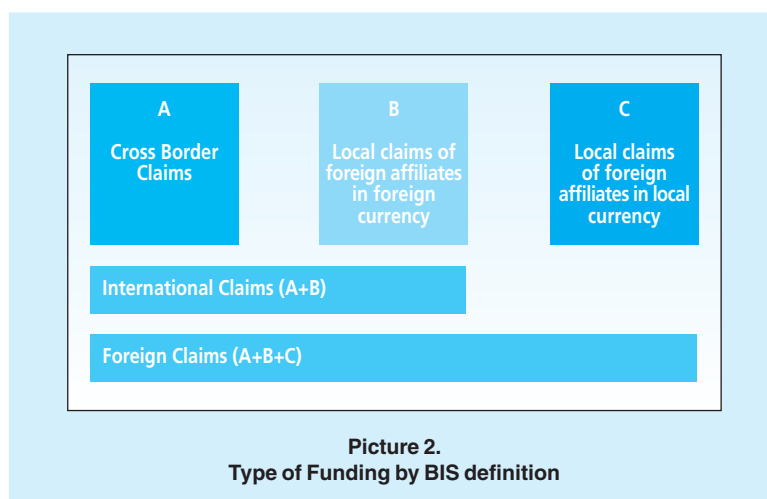
External debt data of the Indonesian banking is from the DIInt banking records of debt transactions with non-residents. The definition of foreign debt recorded by DIInt include debt (in the form of bonds, other securities and domestic securities owned by non-residents), loan agreements, cash and deposits and other liabilities. However, the data used in the study of debt does not include domestic securities owned by non-residents, cash and deposits and other liabilities due to the absence of data for country loans for these three types of claims. Data is shown for quarterly periods from 2007 to 2011. The balance sheets of the banking system from DPIP consists of the entire bank balance sheets available for monthly periods from 2000 to 2011.

BIS data is Consolidated International Banking Statistics at the end of December 2011. The BIS database contains information on the bank's aggregate position from the reporting country (the complainant) to another party (counterparty) and to all countries in the world with reports on a per-quarter frequency. Currently, 30 countries report to the BIS about their financial banking position where there are differences in initial reporting period for each country.

The data available is from the claims complainants to all other countries from direct lending (on an immediate borrower basis). The claims in question are financial assets (the only items on the balance sheet) including cash and deposits with other banks, loans and advances to non-bank and bank ownership debentures, but excluding derivatives and off-balance sheet transactions.

The BIS database financing was prepared from Foreign Claims, International Claims and Local Claims in Local Currency which consisted of the following components:

- a. Cross-Border Claims are loans given from state banks as reported by non-residents.
- b. Local claims of foreign affiliates in foreign currency are loans granted by domestic banks in foreign currency from foreign country reportings or affiliates in the host country. An example is a loan in foreign currency from Citibank in Jakarta to a party in Indonesia.
- c. Local claims of foreign affiliates in local currency are loans granted by domestic banks in the domestic currency from foreign country reportings or affiliates in the host country. An example is a loan in Rupiah from Citibank in Jakarta to party in Indonesia.



IC Data can be broken down by maturity (up to one year, between 1-2 years, and more than 2 years) and based on the borrower's sector (banking, government, and private); but can not be broken down by the source of borrowing. Borrower data sources only existed in the form of foreign claims. BIS data on claims to Indonesia only come from the reporting countries, so this may not fully describe the claims received by Indonesia from other countries or link Indonesia with other countries.

### 3.2. Empirical Model of the Global Financial Shock Impact against the Cross-Border Lending

To determine the impact of a global shock on bank lending (financing) to Indonesia, the identification of determinants of international bank lending to Indonesia will be used by adopting a model used Pontines and Siregar (2012). The model estimates the determinants based on the following dynamic equation panel:

$$\begin{aligned} \Delta \log \text{claims}_{i,t} &= \alpha_0 + \alpha_1 \cdot \Delta \log \text{claims}_{i,t-1} + \beta_1 \cdot \text{growthrate}_{i,t} + \beta_2 \cdot \text{growthrate}_{j,t} + \beta_3 \cdot \text{inthome}_{i,t} \\ &+ \beta_4 \cdot \text{inthost}_{j,t} + \beta_5 \cdot \text{VIX}_t + \beta_6 \cdot \text{icrg}_{j,t} + \beta_7 \cdot \text{TED}_t + \beta_8 \cdot \text{growth}_{i,t} \cdot \text{xexposure}_{ij,t} \\ &+ v_{ij,t} \end{aligned} \quad (15)$$

The dependent variable is the change in foreign claims of data derived from the BIS. This data are aggregated position claims of state banks financing sources (Japan, U.S., UK, and Germany) to Indonesia (including the private, public and banking). Where claims are financial assets (i.e. the only item on the balance sheet), this includes cash and deposits with other banks, and loans and advances to non-bank and bank ownership debentures, but excludes derivatives and off-balance sheet transactions. This data can not be separated by the types of claims. In addition, as described in Chapter 3, the data consists of international claims and local claims (claims granted by foreign affiliates in the host country in both foreign and domestic currency). Thus, the data does not only describe cross-border activity as covered foreign affiliates. However, no other data more appropriately represents the cross-border claims, because other data sources do not inform the lender. Where  $i$  represents the developed countries, Japan, USA, UK and Germany that have the largest share of bank lending to Indonesia, and  $j$  represents Indonesia. The dependent variable  $\Delta \log \text{claims}_{i,t}$  is the change in international bank lending from country  $i$  to Indonesia. Independent variables representing macroeconomic conditions, are represented by GDP growth in Indonesia  $\text{growthrate}_{j,t}$  and the home country  $\text{growthrate}_{i,t}$  and interest rates between  $\text{inthome}_{i,t}$  home and Indonesia  $\text{inthost}_{j,t}$ .

The coefficient for economic growth in Indonesia, which is expected to generate positive signs of economic growth in Indonesia will be the *pull factors* of international bank lending. As for growth in the home country it can be theoretically ambiguous (it can produce two different signs). If a recession in developed countries means a lower chance of getting profit in the country, then the bank will increase lending to Indonesia and  $\text{growthrate}_{i,t}$  sign will be negative. But if a recession in developed countries means a deteriorating capital position there, and the banks would reduce lending to other countries, then the sign of the variable would be positive.

The sign of the coefficient for interest rates in developed countries is expected to be negative. Low interest rates in developed countries tend to signal a period of excess liquidity

and banks indicate an increased willingness to lend to developing countries, which generally have higher interest rates and risk; so the coefficient of this variable is expected to be negative. As for the variable interest rate in Indonesia, it is expected to have positive where interest rates have a higher *pull factor* into the inclusion of bank lending.

In addition to macroeconomic factors, the global financial market is also one of the variables. Variables *VIX* (S & P Volatility Index of the Chicago Board Options Exchange) is the expectations of the indicator of the global financial market volatility in the short term; so the coefficient of this variable is expected to negative. The higher the *VIX*, the more investors see a risk that the market will move sharply or there would be increased expectations of global financial market volatility. This will have implications for the decline in bank lending.

The global liquidity condition is also one independent variable represented by the variable *TED<sub>t</sub>*. *TED<sub>t</sub>* is a measure of credit risk for loans between banks which is the difference between the U.S. T-bill 3 month rate (assets seen no default risk) and the London Interbank Offered Rate (LIBOR) 3 months (interest rates that are unsecured interbank lending). Spreads indicate higher perceptions of banks against the risk of its counterparties that tend to increase and banks hesitate to lend to these counterparties. This implies a tightening of liquidity in the banking sector. Thus, the numbers represent the *TED* global liquidity conditions. The coefficient of this variable is expected to be negative, where with increasing numbers *TED* mean the global liquidity crunch would reduce bank lending to Indonesia.

Risk factors for the country of destination are also one of the independent variables. Global banks tend to reduce the activity of lending to developing countries as risk in the host country increases. The variables use *ICRG* risk rating which is a political, economic and financial rating. The higher the number, the lower the *ICRG* risk of a country; so this variable is expected to have a positive sign where the risk is low for *pull factors* for bank lending to Indonesia.

Further, to examine the impact of the shock to lending banks in developed countries, a' *growth<sub>i,t</sub> . xexposure<sub>i,j,t</sub>* variable is used. This variable is the interaction between the growth in developed countries with *exposure* to the country's banks from Indonesia. This interaction variable represents global banks against the shock reaction that occurs in the country or a commitment from global banks to continue lending to the host country during the shock. *Exposure* is the ratio of bank loans to Indonesia with the total bank loans given in Indonesia. The growth rate in developed countries is a represented by the shock that occurs in a country as characterized by a general deterioration of growth. Together, the shock and deterioration of growth occur together and are inseparable effect.

As Calvo and Mendoza (2000) in Peria et al (2002) show, if the developed country *j* banks has a high exposure in a developing country *i*, then the bank has a big incentive to learn about the country and its growing niche to be more stable for bank lending in the country. If it is true, that high exposure means more stable financing in developing countries, the interaction variable is supposed to have the opposite sign to the shock in the developed countries, which

means negative. But if it does not and this coefficient is positive, then the response of the global bank during the shock is to reduce funding to Indonesia, which means the shock in financing bank lending has been transmitted from the developed world to Indonesia.

**Table 2.**  
**Variables for Cross Border Lending**

Variable	Data Source	Description	Data	Relationship expectations
<b>Variabel Dependen</b>				
$\Delta \text{LOG CLAIMS}$	BIS	Position change of the aggregate loan (log differences) international banking from Japan, U.S., UK and Germany to Indonesia		
<b>Variabel Independen</b>				
<b>GROWTHHOME</b>	CEIC-DKM	Macroeconomic indicators in developed countries as a source of financing, to capture the economic cycle	Real GDP Growth	+/-
<b>GROWTHHOST</b>	CEIC-DKM	Macroeconomic indicators in Indonesia as a financing destination	Real GDP Growth	+
<b>INTHOME</b>	CEIC-DKM/IFS	Indicators of nominal interest rates (official lending rate) in developed countries	Official bank lending in developed countries	-
<b>INTHOST</b>	CEIC-DKM/IFS	Indicators of nominal interest rates (official lending rate) in Indonesia.	Official bank lending in Indonesia	+
<b>VIX</b>	Bloomberg	Indicators of volatility expectations global financial market conditions in the short term	VIX	-
<b>TED</b>	Bloomberg	Credit risk indicators that represent global liquidity	TED (difference between 3-month LIBOR and T-Bill Rate 3 months)	-
<b>ICRG</b>	Bloomberg	Indicators of political, economic and financial risk	ICRG	+
<b>EXPOSURE</b>	BIS	Indicators to capture the exposure of developed world banking in Indonesia	The ratio of foreign claims in Indonesia with the country's total foreign claims given by that country	
<b>GROWTHHOME<sub>x</sub> EXPOSURE</b>	BIS - CEIC	Indicators to capture the reactions of global banking in the country due to the shock of the international activities of its lending bank	Interaction between Real GDP growth in developed countries with banking exposure in Indonesia	+/-

### 3.3. Testing the Impact of Global Banking Placement to Indonesia on the Credit Behavior via Foreign Affiliates

To view an indirect impact of the global financial shock to lending by foreign/ mix banks on domestic economy, this study refers to the model used by Pontines and Siregar (2012). The

study also explored the stability of foreign lending affiliates in six countries in Asia using the global financial crisis of 2008, and explored the influence of foreign lending affiliates in Indonesia.

Estimation was done using a dynamic panel equation to the micro-balance sheet data for foreign affiliates operating in Indonesia. Given the availability of data from DPIP, the period of bank financial data used was quarterly data from 2007Q1 - 2011Q3. The model used is as follows:

$$\begin{aligned} loan_{i,t} = & \alpha_0 + \alpha_1 loan_{i,t-1} + \beta_1 growthhome_{i,t} + \beta_2 intratehome_{i,t} + \beta_3 growthhost_{i,t} \\ & + \beta_4 intratehost_{i,t} + \beta_5 profitability_{i,t} + \beta_6 netinterestmargin_{i,t} \\ & + \beta_7 totalaset_{i,t} + \beta_8 suratberharg a_{i,t} + \beta_9 dummy_{i,t} + \beta_{10} dummy_{i,t} \\ & * dummysubsidiary + v_{i,t} \end{aligned} \quad (16)$$

Index  $i$  is individual foreign banks operating in Indonesia at the time  $t$ . The dependent variable of the model is which is credit extended by foreign banks in Indonesia (host economy). The independent variables include macroeconomic conditions of the country of origin of foreign banks and Indonesia, as the push and pull factors. These variables are GDP of the country of origin of foreign banks ( $growthhome_{i,t}$ ) and the interest rate the country of origin ( $intratehome_{i,t}$ ) as well as the analog of the domestic variables, namely GDP Indonesia ( $growthhost_{i,t}$ ) and interest rates ( $intratehost_{i,t}$ ).

The expected sign of the coefficient of the variable real GDP of Indonesia is positive, where growth in the real GDP encourages foreign banks to increase lending in Indonesia. As for the home country's GDP, it is ambiguous in explanations on cross-border lending. Meanwhile,  $intratehome_{i,t}$  negative signs were expected where higher lending rates in the country of origin of foreign banks will cause the country to be more attractive than the domestic country in which they operate. This applies vice versa for the variable  $intratehost_{i,t}$  where the higher domestic interest rates will provide a higher return so as to attract foreign banks in the domestic lending channel.

In addition to the macro variables, the variable balance sheet of each of the foreign banks operating domestically are also incorporated into the model. The goal is to control bank characteristics that may influence the decision of foreign banks to channel the lending. Moreover, it is to test the underlying hypothesis of this study that the deterioration of the balance sheets of international banks, are mainly from those countries considered to be one of the causes of the sharp decline in international bank lending to emerging crises in the period 2008/2009. One of the indicators of the bank's balance sheet that is used, among other variables, include  $profitability_{i,t}$  as measured by NIM (net interest margin). The higher the NIM enjoyed by the foreign bank, the more the bank is likely to increase lending. Meanwhile, bank size (size) is measured by the total assets variable. Theoretically, the size of the assets of the major banks

(strong) will have a positive impact on the lending activity of the bank. In addition, the control variables used for variable securities held by banks is (*suratberharga<sub>i,t</sub>*). In order to lend, banks have the option of deliver in the form of loans or securities in the money market or in other markets. The higher the placement of the bank in the form of Securities, it will reduce the portion of the loan.

In addition to using a variable to capture macro and bank balance sheet variables, a crisis dummy variable is used *dummy<sub>i,t</sub>* to capture the global crisis with a value of 1 between 2008Q2 - 2009Q3 and 0 for the other periods. The expected sign for the crisis dummy variable is ambiguous because on one hand the coefficient of this variable is not significant as it is known in empirical studies of Peria et al (2005), De Haas and van Lelyveld (2006) and De Haas and van Lelyveld (2010) and the Pontines and Siregar (2012). The reason for these findings is that foreign banks operating in domestically rely on the support of its parent in a state of financial difficulties that make foreign banks relatively insensitive to the crisis episode. Instead the condition is not the case for foreign banks with no or little support from their parents who have 'deep pockets' and should rely on their own sources of funding so that the marks are found to be significantly negative, as shown by Cetorelli and Goldberg (2009) and Pontines and Siregar (2012) for the foreign bank branch.

Another dummy variable used is based on the organizational form of foreign banks operating in Indonesia, namely in the form of branches of foreign banks and a mixture foreign banks. The dummy variable is intended to test the implications of the global financial crisis on the stability of foreign bank lending in the form of branches and mixed foreign banks, where a value of 1 is given to a foreign bank and 0 to a mix of foreign bank branches. Furthermore, dummy variable interacts with the dummy global crisis variable. Interaction of the dummy organizational form of foreign banks with the dummy global crisis was done to see if there is a difference in the organizational form of a bank to mitigate the current crisis during a financial crisis in the parent bank.

A description of each of the variables in the model is presented in the following table:

Table 3. Description of Model Variables Via Foreign Lending Affiliate				
Variable	Data Source	Description	Data	Expected Sign
<b>Dependent Variable</b>				
<b>LOAN</b>	DPIP	Credits distributed by foreign/ mix banks / at periode <i>t</i>		
<b>Independent Variable</b>				
<b>GROWTHHOME</b>	CEIC-DKM	Macroeconomic indicators in developed countries as a source of financing	Real GDP Growth	+/-
<b>GROWTHHOST</b>	CEIC-DKM	Macroeconomic indicators in Indonesia as a destination financing	Real GDP Growth	+

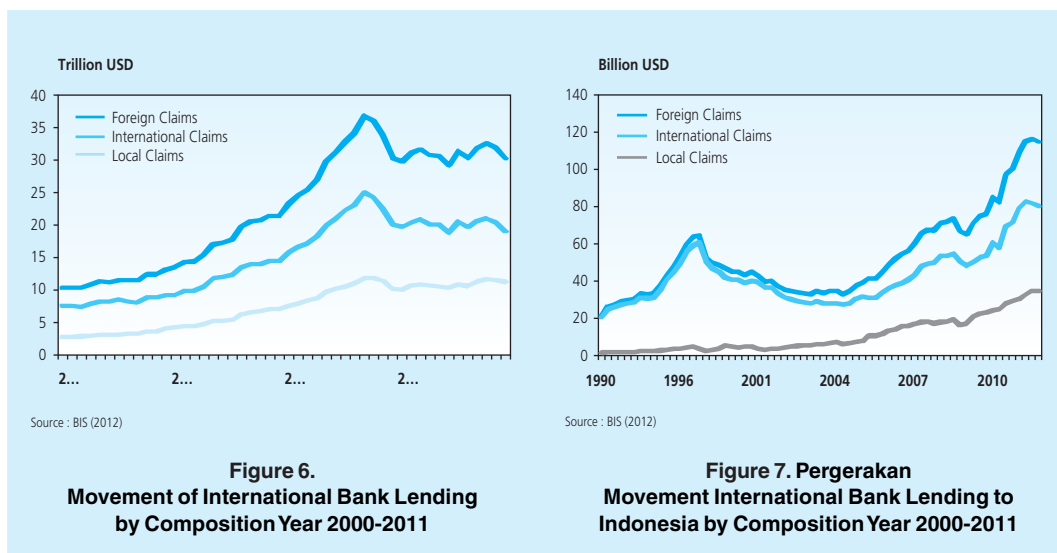
<b>INTRATEHOME</b>	CEIC-DKM	Indicators interest rate home country of a foreign bank $i$ at $t$	official lending rate in developed countries	-
<b>INTRATEHOST</b>	CEIC-DKM	Indicators of interest rate in Indonesia on period $t$	official lending rate in Indonesia	+
<b>INTERESTMARGIN</b>	DPIP	Indicators to capture the interest margin of the banking	NIM	+
<b>TOTALASET</b>	DPIP	Indicators of bank size	Total asset	+
<b>SURAT BERHARGA</b>	LHBU	Alternative control variable of bank placements	Securities held by the bank	-
<b>DUMMY</b>		Indicators of the global crisis period	Number 1 for years 2008Q3 - 2009Q2, and 0 for other periods	+/-
<b>DUMMY JENIS BANK</b>	BIS - CEIC	Type of foreign bank affiliate	1 for mix banks and 0 for foreign banks (branches)	+

## IV. RESULTS AND ANALYSIS

### 4.1. Descriptive Analysis

Based on data from BIS, international bank lending or the so-called foreign claims (FC) consists of international claims (IC) and local claims (LC). The financing world generally was dominated by international claims (IC) as shown by Figure 6. In the 2008 crisis, FC experienced a contraction, which until now has not recovered to the pre-crisis value.

Since recovering from the crisis of 1998, bank lending to Indonesia increased considerably. According to Figure 7, in December of 2011, total bank lending (FC) to Indonesia reached 114



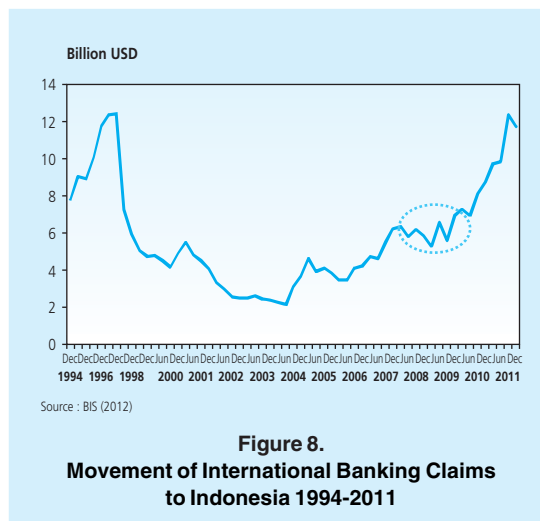


billion USD, equivalent to 5.7% of foreign financing to developing countries in Asia. Although Indonesia is relatively small portion, compared to the year 2000 (an average of 11.4%), the foreign financing to Indonesia was among the highest in Asia after China, India, South Korea, Malaysia, and Singapore. This shows Indonesia's economy was experiencing pull factors of foreign invest.

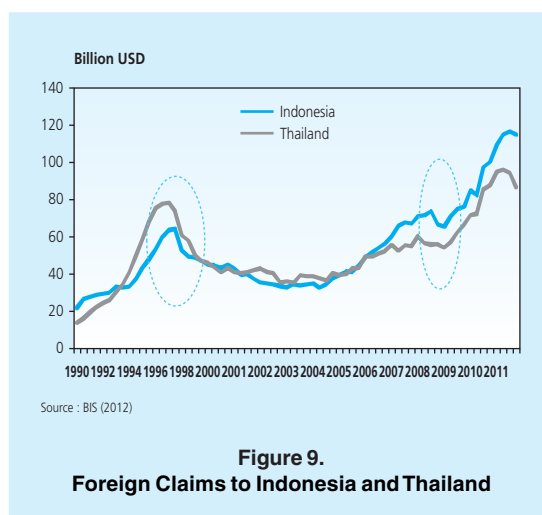
Although Indonesia experienced a slowdown in the 2008 crisis, it was still in better condition than the rest of the world where bank lending decreased by 9%, and Indonesia's recovery was faster (as of December 2011 the value has exceeded the value of pre-crisis 2008). In terms of types of loans, in December 2011 bank lending to Indonesia was dominated by the International Claims (70%) where the magnitude and pattern of bank lending tended to the direction of International Claims.

In December 2011, major recipients of funding (IC) into Indonesia include the private sector (66%), public sector (19%), and banking sector (15%). Lending to banks was the smallest composition of the IC, in line with the structure of other developing countries that have a greater allocation of funding to the private sector. This is possible because banks in developing countries are generally not an attractive place for investors to invest their capital.

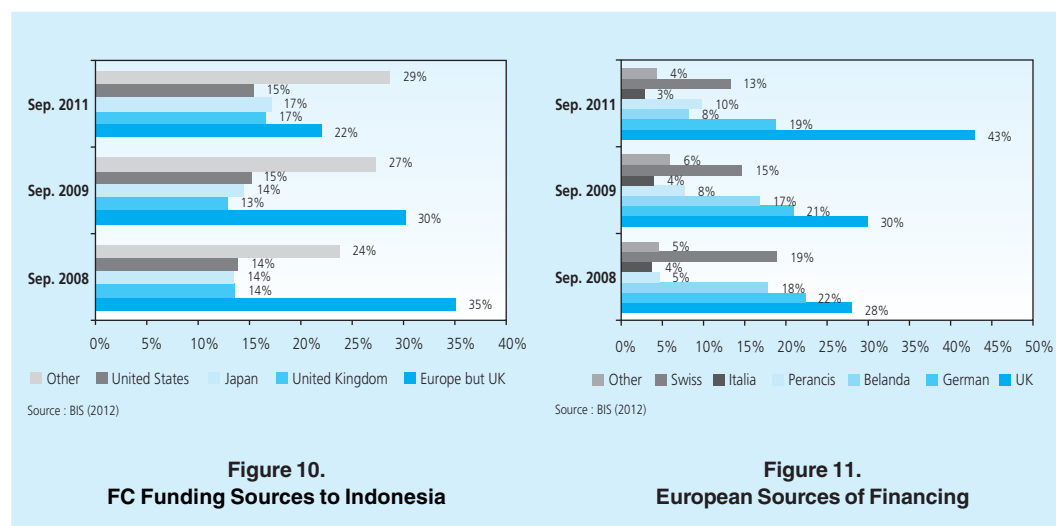
Although smaller, but the contraction experienced in the banking crisis of 1998 (period 1997-2004) was larger (35% p.a.) than the private sector (19% p.a.). As of September 2011, lending to banks rose but did not reach the pre-crisis value of June 1997. Furthermore, as of December 2011, its value began to decline. In the crisis of 2008, a contraction also occurred to bank lending to banks, although the decline was relatively small (Figure 8).



Volatility of bank financing and a sudden reversal was not only experienced in Indonesia but also experienced in other developing countries like Thailand in the 1998 crisis (Figure 9).

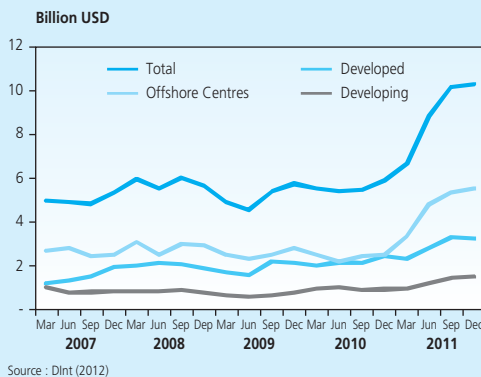


FC sources of financing to Indonesia, at the end of 2011 was dominated by developed countries, U.S., UK, Japan and Germany which accounted for about 56% off unding to Indonesia by December 2011. European countries (approximately 17 European countries) and other countries (including offshore centers) combined to contribute to Indonesia's foreign claims Figure 10. If explored further (Figure 11), donor financing from European countries, UK and Germany, were the main source of financing to Indonesia.

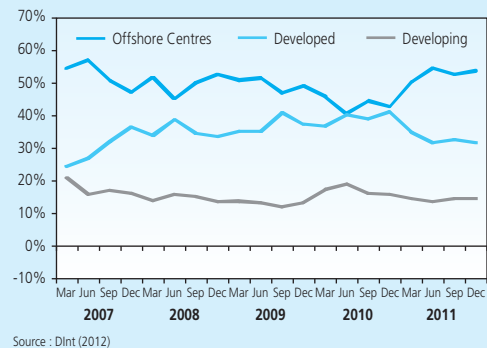


When compared to pre-global crisis, the pattern is slightly changed on which portions of European financing to Indonesia decreased at post-crisis. In the European countries alone, the share of the UK increased, while other European countries declined.

Meanwhile, if you examine the data that goes into the bank lending, with data from DInton cross-border lending, the sources of funds were dominated by offshore centers (average 50%) with a movement of total loans following a pattern of off shore centers (Figure 12). The country share was relatively stable through out the year 2007-2011 (Figure 13) where the other group of developed countries accounted for an average of 35% and 15% of developing countries, respectively. At the time of the 2008 crisis, bank lending to Indonesia declined by 24% (September 2008-June 2009), but after that, loans to the banks saw a large increase of 39% p.a..



**Figure 12.**  
**Movement of Loans to Bank Indonesia**

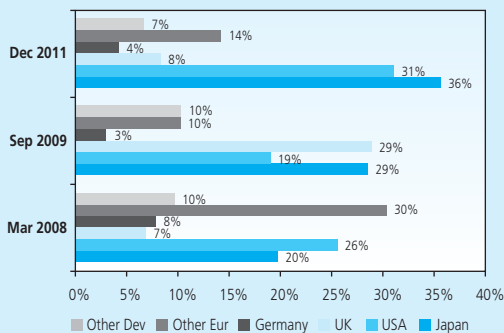


**Figure 13.**  
**The proportion of loans to Bank Indonesia**

If explored further, global financing by developed countries were dominated by Japan, U.S., UK and Germany (Figure 14). Pre-2008 crisis, European (non-UK) banks dominated lending to Indonesia to reach 13% of total loans to Indonesia. But loans, including the share of European (non-UK) loans decreased during the 2008 crisis. Loans decreased by 50% from September 2008 to June 2009 and the share dropped to about 6%. Borrowing from other developed countries also declined through not as big as the decline of Europe where Japan only decreased by 30% (Dec 2008 - Mar 2010) and the United States by 40% (Dec 2008 - June 2009).

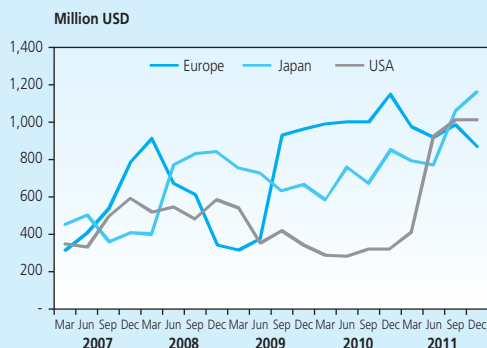
Post-crisis borrowing from the three groups of countries increased but the increase was specific in Europe dominated by the UK. Besides this Japan and the USA dominated lending from developed countries (Figure 15).

The majority of loans was granted by international banks compared to other institutions (91% in December 2011) and in USD (98%). The loan period was dominated by short-term loans (54% as of December 2011) and the proportion consistently increased from the previous period.



Source : DInt (2012)

**Figure 14.**  
**Share of Loans to Bank Indonesia from Developed Countries**

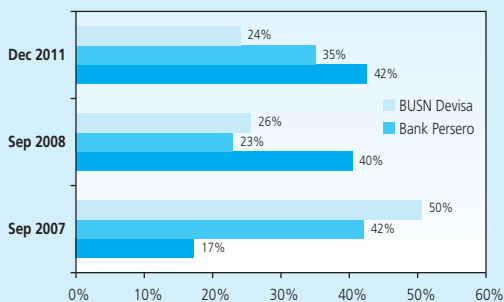


Source : DInt (2012)

**Figure 15.**  
**Movement of Loans to Bank Indonesia by Developed Countries**

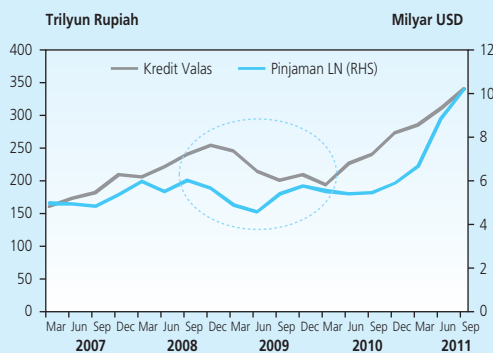
Of the three types of banks that accept bank lending (foreign affiliates, BUSN owned banks and foreign exchange), the share of foreign affiliates increased and by December 2011 it reached 42% (Figure 16), while the share of Bank BUSN Persero and Exchange decreased compared to September 2007.

To avoid double conversion exchange rate, loans obtained from overseas banks were generally used for foreign currency loans in the country. As seen in Figure 17, the pattern of bank loans and foreign currency loans was parallel but the 2008 crisis decreased bank lending by 24% (September 2008-June 2009) and foreign currency loans fell 23% (December 2008 - March 2010).



Source : DInt (2012)

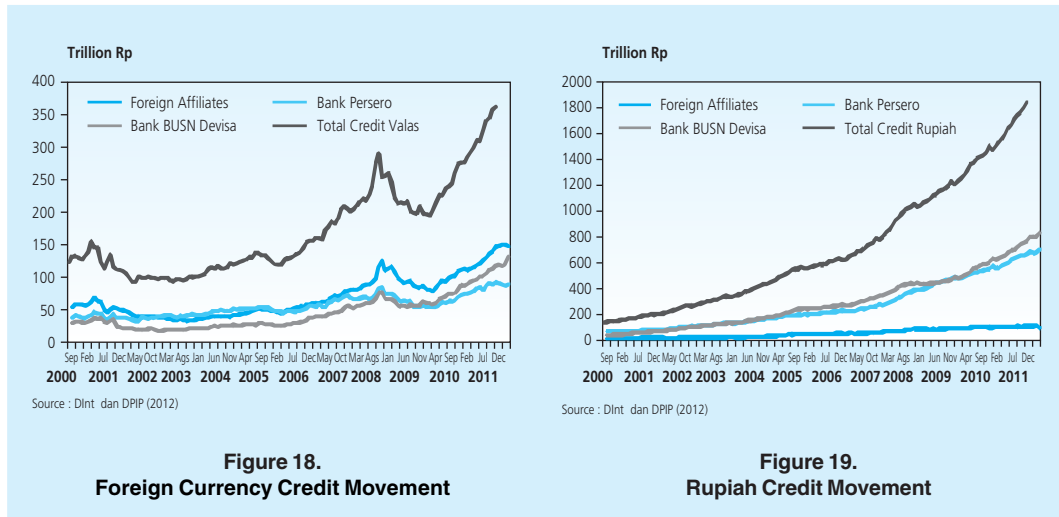
**Figure 16.**  
**Proportion of Bank Lending Interest**



Source : DInt dan DPIP (2012)

**Figure 17.**  
**Credit and Debt Foreign Currency Banking**

The majority of foreign currency loans from banks for the 2007-2008 period came from external debt from foreign affiliates, while the crisis of 2008 caused the contraction of foreign currency loans made by all types of banks (figure 18). On the credit amount, the distribution was dominated by banks and bank partners in BUSN Assets (figure 19) where no visible trend was seen in response to the 2008 global crisis shock, including foreign banks and joint venture banks (foreign affiliates).



## 4.2. Measuring the Impact of the Global Financial Shock Against Cross-Border Lending

To determine the impact of the global shock to financing to Indonesia dynamic panel model equations were used to estimate determinants of cross-border lending to Indonesia. Using a dynamic panel model one can look at pooled OLS, fixed effects and GMM panel estimators. The results of the three tests are shown in the Annex table from testing using software StataSE 11.

As mentioned in Pontines and Siregar (2012), the results of the pooled OLS estimation and the fixed effect of dynamic panel models are generally biased. OLS estimation in autoregressive coefficients will experience an upward bias and from the fixed effect will have downward bias. The results of the Arrelano-Bond estimation on a large sample should be free of bias and with certain assumptions (weak Assumptions) coefficient values should be between the OLS and the fixed effect estimates. The test is referred to as the bounds test for a small sample bias.

In the estimates made by the Pooled OLS, the value of the variable  $\Delta \log \text{claims}_{i,t-1}$  is -0.23, while the estimate of fixed effect is -0.25. The results of the Arrelano-Bond estimation showed

a value of -0.25 which is smaller than the Pooled OLS and equal to Fixed Effect. Thus the Arrelano-Bond estimation is still relatively in accordance with the small sample test. The unit root test was performed on the variables in the equation to determine cross-border lending to Indonesia and generally the variables were stationary.

The results obtained from the Arrelano-Bond estimation are as follows:

Table 4. Estimated results of International Financing Exchange Determinants		
Variable	Coef.	Robust Std. Err
$\Delta \log \text{claims}_{i,t-1}$	-0.23	0.03***)
$\text{growthrate}_{i,t}$	-0.010	0.005**)
$\text{growthrate}_{j,t}$	0.007	0.002***)
$\text{inthome}_{i,t}$	-0.003	0.004
$\text{inthost}_{j,t}$	0.006	0.006
$VIX_t$	-0.002	0.00009*)
$TED_t$	-0.0002	0.00009***)
$\text{icrg}_t$	0.01	0.003***)
$\text{growth}_{i,t} \times \text{exposure}_{ij,t}$	3.29	1.14***)
Cons	-0.72	0.26
***/**/*: significant to 1%/5%/10%		

No misspecification on the model is confirmed in the statistical results of the Arellano-Bond (AB) test for the null hypothesis of no auto-correlation in first-difference residuals. We obtain the  $p$ -value AB AR (1) = 0.06 and AB AR (2) = 0.72,<sup>2</sup>.

Based on the estimates, it was found that economic growth in Indonesia was positive and significantly affected the bank lending to Indonesia at 1% confidence level. Indonesia's economic growth came from *pull factors* for the flow of bank lending to Indonesia.

For growth in the advanced countries as a source of financing, a negative and significant sign was obtained. It can be interpreted that as growth weakened in a country, the opportunity to earn huge profits in the domestic economy was reduced so that the global banks selected countries outside their own country as a place to invest. These findings are similar to Peria et al (2002) who found that the global banking system in some developed countries increased bank lending to other countries during a slowdown in their own country.

For the nominal interest rate, the home country showed negative signs in accordance with the expectations, but not statistically significant. The same was found for the variable interest rates of Indonesia. The resulting coefficient was positive as expected but not statistically significant in influencing bank lending to Indonesia. Pontines and Siregar (2012) also found that the difference in interest rates did not affect bank lending flows into developing countries.

2 Sargan test can not be performed after using a dynamic panel model with robust standard errors since the distribution of the Sargan test is not known when the disturbances are heteroskedastic (Drukker, 2008).

One of the reasons that can explain this is when global banks decide to lend, banks do not only consider the interest rate but also the risks.

This is confirmed by the significance of the risk variables of Indonesia represented by variable  $RISK_{it}$ . This variable is positive and significant, which means the lower the risk in Indonesia, the higher bank lending to Indonesia. Similarly, the global risk conditions are represented by VIX. The VIX coefficient is significant, and has a negative affect on bank lending to Indonesia. Higher VIX Figures means investors see a risk the market which will move sharply (volatile). Increased expectations of global financial market volatility are significantly contributed to a reduction in bank lending from global banks to Indonesia.

Global liquidity conditions, represented by the variable  $TED_{it}$ , is also significant and negatively affects bank lending to Indonesia. As the  $TED_{it}$  number increases that means banks see growing risk and counterparties tend to be reluctant to lend with the implications of global liquidity tightening. When global liquidity tightened, the flow of bank lending to Indonesia also declined, as shown by the negative  $TED_{it}$  coefficient.

For developed countries the growth interaction variables and the country's banking exposure in Indonesia, found a significant and positive coefficient. It means that in the event of a shock, a country is characterized by a declining growth  $growthrate_{it}$ , where the reaction to global banking loans to Indonesia would lowered by the increased exposure of the banking system in Indonesia. This confirmed the role of international bank lending in transmitting a shock that occurred in the lending country to Indonesia. This finding is in line with findings by Pontines and Siregar (2012) that the global banks pull loans (cross border) from developing countries when there is a shock on the economy. Under different conditions, this was also found by Cetorelli and Goldberg (2009) that the global banks that have a vulnerability assets of against the dollar, experience slow growth of bank lending to developing countries during the global crisis.

#### **4.3. The Impact of the Global Banking Placement to Indonesia Concerning Credit Behavior of Foreign Affiliates**

The micro panel model was used to examine foreign bank lending and joint ventures in Indonesia during the global financial crisis in 2008-2009 and the implications of the balance sheet strength of the bank. The data used were quarterly data during the 2007 – 2011 observation period.

Next, calculations were done using three dynamic panel approaches, namely OLS, Arrelano-Bond (AB), and Fixed Effect with the help of the Eviews software version 7. As mentioned in the previous section, Pontines and Siregar (2012) pointed out that the results of the panel OLS estimation and fixed effect (FE) each have upper and lower bias. However, by using a panel of AB an expected bias can be minimized by the dynamic coefficient criterion

variable of the model AB between the value of the coefficient of FE and OLS models. Based on the parameter coefficient estimates, the value of the coefficient of dynamic variables  $\logloan_{i,t-1}$ , for FE models, AB, and OLS are 0651; 0655, and 0782, respectively. Thus, the estimated value of the AB model is an eligible small sample.

Table 5. Dynamic Panel Model for Joint Venture Foreign Bank Credit, 2007-2011	
Variable	ARELLANO-BOND (REV1)
$\logloan_{i,t-1}$	0.655 (0.013)***
$\logdpbhome_{i,t}$	0.245 (0.051)***
$intratehome_{i,t}$	-0.01 (0.009)
$\logdpbhost_{j,t}$	0.462 (0.089)***
$intratehost_{j,t}$	0.087 (0.007)***
$NIM_{j,t}$	0.01 (0.006)*
$\logsize_{j,t}$	0.579 (0.024)***
$\logsuratberhargaj_{j,t}$	-0.01 (0.001)***
$dummy\ crisis_t$	-0.103 (0.018)***
$dummy\ crisis_t \times dummy\ subsidiary_j$	0.047 (0.025)*
Sargan Test	0.48
***/**/*: significant to 1%/5%/10%	

Furthermore, the Sargan test was conducted to test whether the instruments were exogenous. Where  $H_0$  is the overidentifying restriction (model specification) is valid. With a p-value of Sargan test = 0.48, the hypothesis  $H_0$  was accepted meaning the overidentifying restriction (model specification) is valid.

Based on the above estimates of A-B models the effect of the economic conditions both in the home country and the host country (domestic) on loans by foreign and joint venture banks can be seen. The economic condition of the GDP and the interest rate of the host country (Indonesia) was a pull factor for lending by foreign banks / joint ventures. Economic conditions as reflected in economic growth and interest rates as a reflection of yields in Indonesia showed a significant and positive sign. The positive sign of the GDP and the variable interest rate in Indonesia was in accordance with the expected direction. On the other hand, economic conditions (economic growth) of the home country (country of origin of foreign banks) also showed a significant positive sign. This was a push factor for foreign affiliate banks to extend



credit in the host country (domestic). When economic growth in the country increases, foreign banks tend to expand lending (international lending) to other countries, including Indonesia. Meanwhile, the variable interest rate of the home country (country of origin of foreign banks) showed a negative sign but was not significant.

The bank balance sheet variable NIM, also empirically demonstrated a positive direction so that when foreign banks enjoyed a net interest margin that was higher, was a driver for the foreign banks to extend credit. Meanwhile, the size of the bank was positive and significant meaning the bigger foreign bank affiliate assets, the more they tended to add lending. There was a positive and significant influence of the NIM and its size, in line with the findings by Pontines (2012) using panel data of five ASEAN countries plus Korea. In the choosing portfolio optimization for the placement of bank assets, ownership variables in the interbank money market securities or in the equity markets were significant and negative. This means that the credit and the placement on securities are substitutes.

Furthermore, the dummy crisis variable 2008/2009 was significant and negative. These findings indicate that during the global financial crisis period, the loans granted by foreign banks and joint venture banks tended to contract. This is also consistent with the findings of Pontines and Siregar (2012) and Cetorelli and Goldberg (2009) who found that the credit contraction also occurred in lending activities conducted by foreign affiliates in developing countries during the global crisis.

However, when testing the stability of the foreign affiliate credit between the bank and the bank branch of a foreign bank subsidiary, the interaction with the crisis dummy variable, resulted in a positive and significant coefficient. These findings suggested that the bank subsidiary has a more "crisis-mitigating impact" on the economy of Indonesia (host), especially when the source of the shock comes from the global bank's financial condition (parent) than foreign banks. Factors that may explain this was the fixed cost that was irreversible and high which influenced the foreign direct investment banks to set up branches in the host country. This made it difficult for international banks "cut and run" during a crisis, both in the host country and in the home country.

## **V. CONCLUSION**

This paper provides some conclusions; first, as the monetary and banking system, Bank Indonesia needs to understand the determinants of international bank lending to investigate the impact of capital flows for the stability of the financial sector in Indonesia. This is because exposure to financing from developed countries can be a transmission path for shock during a financial turmoil in developed countries as a source of financing. Failure to understand the relationship between the bank (global and regional) will pose a risk to the consistency of macroeconomic policy formulation and the ability to anticipate the impact of the weakness of

the financial sector to the country's macroeconomic conditions. Secondly, based on examination of the determinants of financing to Indonesia, international factors exhibited significant affect to bank lending as pull factors and push factors such as economic growth in the country of origin and Indonesia. Risk factors for Indonesia and the global financial markets and global liquidity conditions also exhibited significant affectsto bank lending to Indonesia. In addition, the study also found that when there was a shock in a country, global banking would tend to decrease bank lending to Indonesia despite increased financing exposure in Indonesia. This means that the bank lending directly (cross-border) transmits the shock from developed countries to Indonesia. Third, based on the examination of bank lending and a mix of foreign banks in Indonesia (foreign affiliates), it can be concluded that the activity of credit by foreign affiliates are affected by domestic economic growth (pull factor) and the country of origin (push factor). In the event of a crisis in the country of the parent bank, loans by foreign affiliates appeared to contract. This means that the bank lending indirectly transmits shock from developed countries to Indonesia. However, it is known that the estimation of foreign affiliates in the form of subsidiary (locally incorporated) appeared more resistant to the shock of the financial turmoil that occurred in the (home) country compared with the parent bank in the form of a branch office.

These conclusions have policy implications both directly and indirectly. Empirically, international bank lending is one shock transmission path from developed countries to Indonesia either directly (cross-border) and indirectly through the activities of foreign affiliates in Indonesia credit. When there is a shock in the home country (parent bank), banks in developed countries reduced bank lending activity in Indonesia. However, we found for foreign affiliates, subsidiary bank credit activity (venture banks) appeared more stable than foreign banks. When there was a crisis in their home country, the bank continued to see a mixture of credit activity compared to foreign banks. Thereby supporting the subsidiary form of foreign banks may be one policy option to support financial stability in Indonesia. However, encouraging foreign banking subsidiaries does not mean a guarantee of complete isolation of the domestic banking system from the possible sudden reversal of international bank lending. The role of regulators and supervision remains an important factor in maintaining the stability of the banking sector as a whole.

## REFERENCES

- Abdullah, Piter (2010). *Foreign Claims by Global Banks: The Role and Implications In Indonesia*. Centre of Education & Central Bank Studies, Bank Indonesia.
- Agenor, Pierre-Richard (1998). "The Surge in Capital Flows: Analysis of 'Pull' and 'Push' Factors". *International Journal of Finance and Economics* 3: 39–57.
- Aiyar, Shekhar (2011), "How did the Crisis in International Funding Markets Affect Bank Lending? Balance Sheet Evidence from the United Kingdom", Bank of England, Working Paper No. 424.
- Allen, Franklin, Aneta Hryckiewicz, Oskar Kowalewski, and Günseli Tümer-Alkan (2012), "Transmission of Bank Liquidity Shocks in Loan and Deposit Markets: The Role of Interbank Borrowing and Market Monitoring", Wharton Financial Institutions Center, Working Paper 10-28.
- Calvo, Sara, and Carmen Reinhart, 1996, "Capital Flows to Latin America: Is There Evidence of Contagion Effects?" in *Private Capital Flows to Emerging Markets*, ed. by G. Calvo and others (Washington: Institute for International Economics).
- Cetorelli, Nicola and Linda S. Goldberg (2010), "Global Banks and International Shock Transmission: Evidence from the Crisis", NBER Working Paper Series, Working Paper 15974.
- Drukker, David M. (2008), "Summer North American Stata Users Group meeting", Stata Corp. 1 / 32
- Elton, Edwin J., Martin J. Gruber, Stephen J. Brown, and William N. Goetzmann (2003). *Modern Portfolio Theory and Investment Analysis*, 6<sup>th</sup> ed. New Jersey: John Wiley and Sons Ltd.
- Mian, Atif and Asim Jaz Khwaja (2006), "Tracing the Impact of Bank Liquidity Shocks: Evidence from an Emerging Market", NBER Working Paper Series, Working Paper 12612.
- Pontines, Victor and Reza Siregar (2012), "How Should We Bank With Foreigners? An Empirical Assessment of Lending Behaviour of International Banks To Six East Asian Countries", Centre For Applied Macroeconomic Analysis, Working Paper 4.
- Powell, Andrew, Maria Soledad Martinez Peria and Ivanna Vladkova (2002), "Banking on Foreigners: The Behaviour of International Bank Lending to Latin America, 1985-2000", Centro de Investigación en Finanzas.

Siregar, Reza Y. (2012), "Globalized and Interconnected Banking System: Selected Issues and Challenges", AMRO.

Siregar, R.Y. and Choy K.M (2010), "Determinants of International Bank Lending from Developed World to East Asia", IMF Staff Papers, Vol. 57, No. 2, pp. 484-516.

Vita, Glauco De and KS Kyaw (2007). "Determinants of Capital Flows to Developing Countries: A Structural VAR Analysis," Journal of Economic Studies, Vol. 35 No. 4. 2008, pp. 304-322.

Zulverdi, Doddy, Iman Gunadi, Bambang Pramono, dan Wahyu Ari Wibowo (2004), "Pengembangan Model Portofolio Bank", Working Paper DKM BI.